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GREENHOUSE TOMATO BREEDING SPRING CROP 1987 EVALUATION TRIALS, WOOSTER

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Greenhouse Tomato Breeding Spring Crop 1987 Evaluation Trials, Wooster

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Spring crop evaluation trials at OSU-OARDC Wooster were carried out to complete a two crop cycle on new experimental lines. These lines were developed to increase productivity and quality and too add resistance to Fusarium Wilt Race II and Root-Knot Nematode (Table 1). All the hybrids and inbreds in the study were pink-fruited greenhouse types.

During the fall study five new hybrids (Ohio 1498, Ohio 1499, Ohio 1403, Ohio 1412, and Ohio 1413) had significantly higher early yields and total yields than the standards Ohio CR6 and Ohio MR13 (1). The two most promising hybrids Ohio 1499 and Ohio 1403 had a tendency towards production of more US #1 fruit.

Materials and Methods

Eight hybrids and 3 inbreds (Table 1) were evaluated in a replicated trial as a spring crop in 1987. The trial had 24 plants/entry divided into

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4 replications. Seeds were sown on October 16, 1986 and seedlings were transplanted into 4 inch plastic pots on November 4. Germinated seedlings received 22 umol m^{-2} s^{-1} of supplimental irradiance during the daylight hours until transplanting into steam sterilized ground beds on January 8, 1987.

There were 6 plants per row and the spacing was 36" between and 18" within rows. After transplanting to ground beds a starter solution of 6 lb. per 100 gal. (10-52-8) was applied at the rate of 1/2 pint per plant. A peanut hull mulch was applied after transplanting. Cultural practices during the growing season were standard. Plants were hand pollinated with an electric vibrator and watering was done with a hose. Temperatures were 70 - 75 °F during the day and 62 °F night. Biweekly harvesting and grading started on March 3 and lasted until June 18. The crop was topped May 22 and one 300ppm application of K_2SO_4 was applied on February 2.

Table 1. Response of the entries in this trial to some of the major greenhouse tomato diseases.[1]

Entry	Type[3]	TMV (Tm2[2])	Fusarium Crown & Root Rot (FCRR)	Fusarium Wilt Race 1 (I)	Fusarium Wilt Race 2 (I-2)	Verticillium Race 1 (Ve)	Verticillium Race 2 (Ve-2)	Root Knot Nematode M. incognita (Mi)
Ohio CR6	H	R	R	R	S	R	S	S
Ohio MR13	I	R	S	R	S	S	S	S
F1489	H	R	R	R	Het	Het	S	R
Ohio 1403	H	R	R	R	R	R	S	R
Ohio 1412	H	R	R	R	R	R	S	R
Ohio 1413	H	R	R	R	R	R	S	R
Ohio 1497	H	R	R	R	R	R	S	R
Ohio 1498	H	R	R	R	R	R	S	R
Ohio 1499	H	R	R	R	R	R	S	R
Ohio 11	I	R	R	R	S	S	R	S
Ohio 12	I	Het	R	R	S	S	R	S

[1]R = Resistant, S = susceptible, and Het = Heterozygous.

[3]H = Hybrid and I = Inbred.

Results

The results indicate that for most characteristics studied there were no differences between Ohio CR6 and the Ohio 1400 series (Tables 2 & 3). There was a slight tendency for the percentage of #1 fruit to be higher for Ohio 1403, 1497, 1498, and 1499 than Ohio CR6. However, early fruit size and yield for Ohio 1497 and 1499 was significantly lower than Ohio CR6. Overall, Ohio 1413 had significantly larger fruit than Ohio CR6 but it also had a significantly lower early fruit yield. Ohio 11 and 12 produced very poor fruit quality and significantly less fruit than Ohio CR6.

Table 2. Yield, fruit size and fruit quality characteristics for the first 5 weeks of the 1987 spring crop greenhouse tomato evaluation trial.

					Fruit Disorders				
Entry	No. Fruits/ Plant	Fruit Wt./ Plant (oz.)	Fruit Size (oz.)	% No. 1 Fruit	% Cracked	% Off Shape	% Rough	% Blossom End Rot	% Zippered
Ohio CR6	11.5	75.5	6.6	58.5	3.0	6.5	70.0	0.75	4.0
Ohio MR13	10.4	54.6	5.3	52.6	12.5	1.5	48.5	1.50	15.3
F1489	9.6	61.8	6.4	41.0	7.8	1.8	80.0	2.25	5.0
Ohio 1403	10.8	69.6	6.4	61.8	12.3	3.5	64.5	0.75	2.3
Ohio 1412	7.6	46.5	6.2	57.0	11.8	1.8	60.8	1.00	4.8
Ohio 1413	9.1	61.5	6.8	55.8	9.5	4.0	70.0	0.25	5.8
Ohio 1497	10.7	62.5	5.9	69.0	7.3	4.0	45.0	0.00	2.0
Ohio 1498	11.1	70.0	6.2	63.5	6.3	4.0	63.8	0.25	6.3
Ohio 1499	9.7	56.6	5.8	65.0	5.8	5.3	59.3	0.00	3.0
Ohio 11	10.7	62.9	5.6	17.3	6.3	5.3	100.0	2.00	2.3
Ohio 12	8.3	58.0	7.0	14.0	5.3	2.5	93.5	0.75	1.8
LSD 5%	2.3	13.8	0.6	12.5	ns	ns	14.3	ns	4.7

Table 3. Yield, fruit size and fruit quality characteristics for the 1987 spring crop greenhouse tomato evaluation trial.

Entry	No. Fruits/ Plant	Fruit Wt./ Plant (oz.)	Fruit Size (oz.)	% No. 1 Fruit	Fruit Disorders				
					% Cracked	% Off Shape	% Rough	% Blossom End Rot	% Zippered
Ohio CR6	40.2	230.4	5.7	53.0	7.8	6.8	70.8	0.25	1.5
Ohio MR13	35.9	183.1	5.1	50.0	21.3	3.5	50.8	0.25	9.3
F1489	36.8	218.9	5.9	42.3	12.0	6.5	74.8	0.25	3.3
Ohio 1403	39.3	226.5	5.7	55.5	12.3	5.8	63.8	0.50	1.0
Ohio 1412	38.6	216.1	5.6	51.8	12.0	4.5	62.8	0.00	3.3
Ohio 1413	36.4	221.2	6.1	52.0	12.0	5.8	68.0	0.00	3.5
Ohio 1497	41.9	222.9	5.3	63.0	8.3	5.5	51.5	0.00	1.3
Ohio 1498	41.4	234.5	5.6	57.0	8.8	6.0	66.3	0.00	1.8
Ohio 1499	37.8	206.9	5.5	56.0	7.8	5.3	62.5	0.00	2.0
Ohio 11	32.5	178.3	5.5	15.3	6.0	12.3	99.0	0.75	1.3
Ohio 12	32.5	199.8	6.2	7.8	11.3	4.3	97.5	0.25	1.5
LSD 5%	3.6	23.4	0.4	6.9	5.8	3.1	7.7	ns	1.3

Discussion

Ohio 11 and 12 only have value as breeding material for transfer of Verticillium Race 2. Because Ohio 1497 is thought to have fruit too small for commercial production Ohio 1499 would probably also not be acceptable for a spring crop. Ohio 1498 and Ohio 1403 should be examined in spring crop commercial trials as possible replacements for Ohio CR6. Results from the 1986 fall crop study (1) indicate that Ohio 1499 and 1403 should be examined in fall commercial trials. Breeding work is continuing with the objectives of multiple pest resistance and large, smooth, firm, flavorful fruit.

Literature Cited

1. Berry, S. Z., G. L. Oakes, W. A. Erb, N. J. Flickinger and M. R. Uddin. 1987. Greenhouse tomato breeding summary and fall crop 1986 evaluation trials, Wooster. Horticulture Series No. 577.

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